

REMARKS

Claims 22-38 are pending in the application.

Claims 22-28 are rejected under 35 U.S.C. § 112.

Claims 22, 23, 28, 37 and 38 are rejected under 35 U.S.C. § 102(e).

Claims 24-27 are rejected under 35 U.S.C. § 103(a).

Claims 29-36 are allowed.

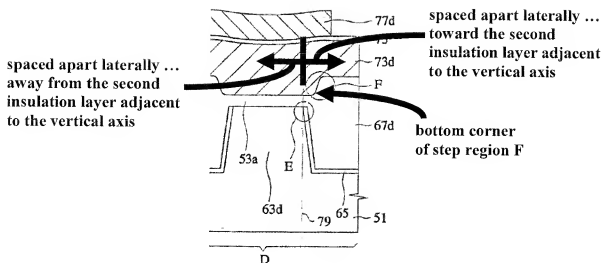
No new matter is added.

Applicants request reconsideration and allowance of the claims in light of the following remarks.

Claim Rejections – 35 U.S.C. § 112

Claims 22-28 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for allegedly failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, the Office Action asserts that claim 22 is indefinite because “it is not understood structurally how a bottom corner of the step region is spaced apart laterally and ‘toward the second insulation layer’.” Applicants respectfully submit, however, that claim 22 does not merely recite that the bottom corner of the step region is “spaced apart laterally and toward the second insulation layer.” Rather, claim 22 recites wherein “the bottom corner of the step region is spaced apart laterally from [the] vertical axis toward the second insulation layer adjacent to the vertical axis.” This is clearly shown in FIG. 13 and described at page 10, lines 5-7 of the specification as originally filed. An exemplary description of how the claim language is shown in the figure will now be made with respect to the partial reproduction of FIG. 13 below.



As shown above, the bottom corner of step region F is spaced apart laterally from vertical axis 79, which passes through an upper edge corner E of the second active region 63d. Further, the bottom corner is located to the right of the vertical axis 79. Therefore, the bottom corner is spaced apart laterally from the vertical axis 79 toward the second insulation layer 67d that is adjacent to the vertical axis 79. If the bottom corner were located to the left of the vertical axis 79, then the bottom corner would be spaced apart laterally from the vertical axis 79 toward the center of the high voltage gate insulating layer 53a (i.e., away from the second insulation layer 67d that is adjacent to the vertical axis 79).

As set forth at M.P.E.P. § 2173.02, “[d]efiniteness of claim language must be analyzed, not in a vacuum, but in light of: (A) The content of the particular application disclosure; ... and (C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.” In view of the above, Applicants respectfully submit that both the disclosure and the drawings as originally filed clearly describe that which is being claimed and further submit that one of ordinary skill in the art would interpret the claim language as described in the paragraph above. For at least these reasons, Applicants respectfully submit that claim 22 complies with the requirements of 35 U.S.C. § 112, second paragraph.

Claim Rejections – 35 U.S.C. § 102

Claims 22, 23, 28, 37 and 38 are rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by U.S. Patent No. 6,921,947 issued to Furuta, et al. (hereinafter “Furuta”). Applicants respectfully traverse this rejection.

A claim limitation which is considered indefinite cannot be disregarded. See M.P.E.P. § 2143.03. As set forth at M.P.E.P. § 2173.06:

When the terms of a claim are considered to be indefinite, at least two approaches to the examination of an indefinite claim relative to the prior art are possible.

First, where the degree of uncertainty is not great, and where the claim is subject to more than one interpretation and at least one interpretation would render the claim unpatentable over the prior art, an appropriate course of action would be for the examiner to enter two rejections: (A) a rejection based on indefiniteness under 35 U.S.C. 112, second paragraph; and (B) a rejection over the prior art based on the interpretation of the claims which renders the prior art applicable. ... Second, where there is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of a claim, it would not be proper to reject such a claim on the basis of prior art....

The rejection under 35 U.S.C. § 112, second paragraph, appears to be based upon an interpretation of only a part of a limitation recited in claim 22 (i.e., the bottom corner of the step region is spaced apart laterally and toward the second insulation layer) as opposed to the entire limitation recited therein (i.e., the bottom corner of the step region is spaced apart laterally from the vertical axis toward the second insulation layer adjacent to the vertical axis). Accordingly, the Office Action has failed to establish that a great deal of confusion exists as to the proper interpretation of the aforementioned limitation of claim 22, which would justify completely ignoring the aforementioned limitation of claim 22. Moreover, and as shown above, the degree of uncertainty in the language of claim 22 is not great because the claim limitation can be subjected to at least one reasonable interpretation. In view of the above, Applicants respectfully submit that all of the limitations in claim 22 should be considered for purposes of patentability in light of the prior art.

Rejecting claim 22, the Office Action asserts that FIG. 14 of Furuta shows first-type step regions, formed from the top surface of the gate oxide film GX1 to the top surface of the

isolation insulating film 2, and also second-type step regions formed in the center of the isolation insulating films 2 that face away from the channel implant region 5A and gate oxide film GX1. Nevertheless, claim 22 only recites one type of step region – the type that is formed from the top surface of the high voltage gate insulation layer to the top surface of the second isolation layer. Accordingly, Applicants respectfully submit that the aforementioned second-type step regions of Furuta do not read on the step regions recited in claim 22.

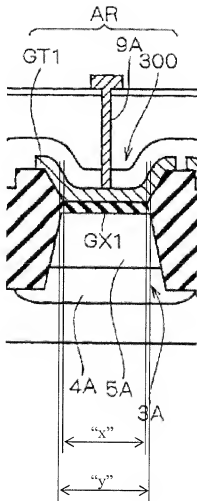
FIG. 14 of Furuta illustrates wherein a bottom corner of one of the aforementioned first-type step regions (i.e., step regions formed from the top surface of the gate oxide film GX1 to the top surface of the isolation insulating film 2) is spaced apart laterally from a vertical axis passing through an upper edge corner of the channel implant region 5A away from the isolation insulating film 2 that is adjacent to the vertical axis. Accordingly, Furuta does not teach wherein the bottom corner of the first-type step region is spaced apart laterally from a vertical axis passing through an upper edge corner of the channel implant region 5A toward the isolation insulating film 2 that is adjacent to the vertical axis. Accordingly, Furuta does not show the elements of claim 22, in as complete detail as is contained in claim 22, and therefore does not anticipate claim 22. See M.P.E.P. § 2131.

Claims 23, 28 and 37 depend from claim 22 and, therefore, include each and every element recited in claim 22. Accordingly, Applicants respectfully submit that Furuta fails to anticipate claims 23, 28 and 37 for at least the reasons presented above with respect to claim 22.

Further rejecting claim 37, the Office Action asserts that an entirety of the aforementioned second-type step region of Furuta is “spaced apart from the vertical axis ... since the step region is formed in the center of the isolation layer and spaced away from the edge of the active region.” As mentioned above, however, claim 22 defines the step region as being formed “from the top surface of the high voltage gate insulation layer to the top surface of the second isolation layer.” Therefore, the second-type step region of Furuta does not read on the step region recited in claim 37. Moreover, the aforementioned first-type step region of Furuta crosses the vertical axis passing through the upper edge corner of the channel implant region 5A and, therefore, a substantial entirety of the first-type step region cannot be spaced apart from the vertical axis as recited in claim 37. For at least this additional reason, Applicants respectfully submit that Furuta does not show the elements of claim 37, in as complete detail as is contained in claim 37, and therefore does not anticipate claim 37. See M.P.E.P. § 2131.

Rejecting claim 38, the Office Action asserts that step regions are formed “from the top surface of the ... [gate oxide layer GX1] to the top surface of the ... [isolation insulating film 2] wherein a distance between the bottom portion of the first step region (in isolation layer 2 on the left) and the bottom portion of ... an ... adjacent step region (in isolation layer 2 in the center of the device) ... is greater than the width of the top surface of the ... [channel implant region 5A].” Applicants respectfully disagree.

FIG. 14 of Furuta (partially reproduced below) clearly shows wherein the width (e.g., “y,” shown below) of the top surface of the channel implant region 5A is wider than a distance (e.g., “x,” shown below) between the bottom portion of a first step region and the bottom portion of an adjacent step region that is across the channel implant region 5A from the first step region.



Applicants further submit that the relatively narrow distance between bottom portions of adjacent step regions is a necessary result of the oxidation processes by which the gate oxide layer GX1 is formed, as shown in FIGS. 16-19 of Furuta. See Furuta, column 13, lines 62-67. Compare the process shown in FIGS. of 16-19 of Furuta with the process shown and described with respect to FIGS. 10-12 at page 7, line 11-page 8, line 29 of the specification. As is evident the processes used to obtain the structure shown in FIG. 14 of Furuta and the structure shown in FIG. 12 of the specification are different. Accordingly, the structure shown in FIG. 14 of Furuta is different from the structure recited in claim 37.

Because the distance between bottom portions of adjacent step regions of Furuta is necessarily less than the width of the top surface of the channel implant region 5A, Applicants respectfully submit that the distance between bottom portions of adjacent step regions of Furuta cannot be greater than the width of the top surface of the channel implant region 5A as asserted in the Office Action. Accordingly, Applicants respectfully submit that Furuta does not show the elements of claim 38, in as complete detail as is contained in claim 38, and therefore does not anticipate claim 38. See M.P.E.P. § 2131.

Claim Rejections – 35 U.S.C. § 103

Claims 24-27 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Furuta and further in view of U.S. Patent No. 6,642,105 issued to Kim, et al. (hereinafter “Kim”). Applicants respectfully traverse this rejection.

Claims 24-27 depend from claim 22 and, therefore, include all of the elements recited in claim 22. As established above, claim 22 is neither anticipated, nor rendered obvious, by Furuta. Kim does not supply any teaching which, when combined with Furuta, renders claim 22 obvious. Accordingly, Applicants submit that claims 24-27 are in condition for allowance for at least the same reasons given with respect to the rejection of claim 22.

Allowable Subject Matter

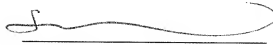
Applicants appreciate the allowance of claims 29-36.

CONCLUSION

For the foregoing reasons, Applicants request reconsideration and allowance of claims 23-38 of the application as amended. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

Respectfully submitted,

MARGER JOHNSON & McCOLLOM, P.C.

A handwritten signature in dark ink, appearing to read 'Hosoon Lee', is written over a horizontal line.

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